

Description of a new subspecies of *Erebia cassioides* (Reiner & Hohenwarth, 1792) (Lepidoptera: Nymphalidae: Satyrinae) from Bulgaria

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Description of a new subspecies of *Erebia cassioides* (Reiner & Hohenwarth, 1792) (Lepidoptera: Nymphalidae: Satyrinae) from Bulgaria. - *Erebia cassioides centrorilica* ssp. n. from Rila Mountains, Bulgaria is described and figured. It is compared with other subspecies known from the Balkan Peninsula and especially with the closest *E. cassioides macedonica* Buresch, 1918 and *E. cassioides kinoshitai* Beshkov, 1996. The recent distribution of *E. cassioides* (Reiner & Hohenwarth, 1792) in the mountains of Balkan Peninsula is displayed as a typical example of Glacial disjunction. Some bionomical notes are given.

Key-words: Satyrinae - *Erebia* - new subspecies - taxonomy - Bulgaria - Europe.

INTRODUCTION

The Common Brassy Ringlet, *Erebia cassioides* (Reiner & Hohenwarth, 1792), is a characteristic representative of the Bulgarian high montane and alpine fauna. It also occurs in the mountains of Spain, France, Switzerland, Austria, Italy, Bosna and Herzegovina, Yugoslavia, Albania, Macedonia, Greece and Rumania. The Bulgarian part of the species range consists of three well separated geographically groups of colonies: in Stara Planina Range, Rila and Pirin Mountains (Fig. 1). The recent distribution can be considered as a typical example of Glacial disjunction.

Taxonomically the species is polytypic; formerly four endemic subspecies were known from the Balkan Peninsula. *Erebia cassioides illyrica* Lorković, 1953 occurs in Bosna and Hercegovina (Maglič), Montenegro (Volujak, Durmitor, Žljeb) and North Albanian Alps; *Erebia cassioides illyromacedonica* Lorković, 1953 occupies Macedonian mountains Šar, Korab, Jakupica and Pelister; *Erebia cassioides macedonica* Buresch, 1918 is known from Pirin and *Erebia cassioides kinoshitai* Beshkov, 1996 from Stara Planina. The taxon inhabiting Central Pindos Range (Athamanon Mts) in Greece remains unnamed.

The occurrence of the species in Rila Mountains has been well known for many years but paradoxically specimens from this region have been considered great rarity (showing even a total absence in public collections). In 1998 during my visit to

Central Rila Mountains a fine series of specimens was collected. Additional material was gathered in 2000 in NW Rila. In a subsequent examination and comparison with specimens of the closest taxa from other mountains the taxon inhabiting Rila has also been found different taxonomically. Here it is described and named as follows.

Terminology concerning external anatomy used here follows the standard one already used by Higgins (1975), Higgins & Riley (1984), Tolman & Lewington (1997), etc. All the measures were taken with the help of a stereomicroscope MBS-10.

Acronyms used:

CIZS	Institute of Zoology, Sofia, Bulgaria
CSAS	Stanislav P. Abadjiev, Sofia, Bulgaria
CSBS	Stoyan Beshkov, Sofia, Bulgaria
MHNG	Muséum d'histoire naturelle, Geneva, Switzerland
NMNH	National Museum of Natural History, Sofia, Bulgaria

***Erebia cassioides centroricila* ssp. n.**

Figs 2-3, 6, 8, 10, 13

Type locality: Bulgaria: [Central] Rila Mts: [SW slope of] Suha Vapa [Peak]: 2450 m (holotype label, see below).

Type material:

Holotype ♂, with labels: (1) printed (on white paper) "BULGARIA / Rila Mts / Suha Vapa 2450 m / 13.VIII.1998 / S. Abadjiev leg."; (2) printed (on red paper), double framed "HOLOTYPE ♂ / *Erebia cassioides* / *centroricila* / subsp. nov. / [line] / S. Abadjiev det. 2000" (MHNG).

Paratypes 24 ♂♂, 4 ♀♀ of which: 1 ♂, 1 ♀ with data labels same as in the holotype, but from 2200 m, and with additional rows "[line] / S. Abadjiev coll. 1277 (1278 respectively)"; 2 ♂♂ with labels: same as above, but from 2350 m, and in the last row "S. Abadjiev coll. 1331 (1332 respectively)"; 5 ♂♂, 1 ♀ with data labels same as in the holotype with additional rows "[line] / S. Abadjiev coll. 1311 (1312, 1322, 1324, 1325 and 1327 respectively)"; 2 ♂♂ with data labels same as in the holotype; 1 ♂ with labels: (1) printed (on white paper) "Bulgaria, Rila Mts. / Dzhanka, 2400 m. / 03.VIII.1996. / S. Beshkov & / J. Nowacki leg.", (2) printed (on light green paper) with handwritten inscriptions [here italicised] "Green. prep. / No. 6./03.III.97 / S. Beshkov", (3) handwritten (on yellow paper) "E. cassioides / macedonica / Buresch, 1918"; 1 ♂ with labels: (1) printed (on white photo paper) "BULGARIA, Rila mount. / Granthar hut, 2180 m. / 29.08.1987 / St. Beschkov leg.", (2) handwritten (on white paper) "Gen. prep. 2./ / 06.III.1995 / Beshkov"; 1 ♂ with labels: (1) printed (on white photo paper) "Bulgaria, Rila Mt. / under Kanarata Top / 2500 m. / 30.VIII.1987 / S. Beshkov leg.", (2) handwritten (on white paper) "Gen. prep. 4./ / 06.III.1995 / Beshkov"; 1 ♂ with labels: (1) printed (on white photo paper) "Bulgaria, Rila Mt. / under Angelov Vrah / Top, 2600 m. / 31.VIII.1987 / S. Beshkov leg.", (2) handwritten (on white paper) "Gen. prep. 6./ / 06.III.1995. / Beshkov"; 1 ♀ with labels: (1), printed (on white photo paper) "Bulgaria, Rila Mt. / under Angelov Vrah / Top, 2600 m. / 31.VIII.1987 / S. Beshkov leg.", (2) handwritten (on white paper) "Gen. prep. 8./ / 06.III.1995. / Beshkov"; 3 ♂♂, 1 ♀ with labels: printed (on white paper) "BULGARIA / Rila Mts / [above Rilski Manastir] / VIII.1987 / [R. Radev] leg."; 2 ♂♂ with data labels: printed (on white paper) "BULGARIA / Rila Mts / Tcherni Ridge 2300 m / 24.VII.2000 / Dr S. Abadjiev leg. / [line] / Dr S. Abadjiev coll. 1762 (1763 respectively)"; 4 ♂♂ with labels: same as above, but from 2400 m, and in the last row "Dr S. Abadjiev coll. 1764 (1765), 1766, 1767 respectively"; 1 ♂ with label: same as above, but lacking last 2 rows; all the paratypes with printed (on red paper), double framed "PARATYPE ♂ (♀ respectively) [1] ([2-28] respectively) / *Erebia cassioides* / *centroricila* / subsp. nov. / nov. / [line] / Abadjiev det. 2000" (paratypes 1-10, 22-27 in CSAS, paratypes 11, 28 in CIZS, paratype 12 in MHNG, and paratypes 13-21 in CSBS).

Etymology: Toponymical name, compound word derived from "central" and "Rila".

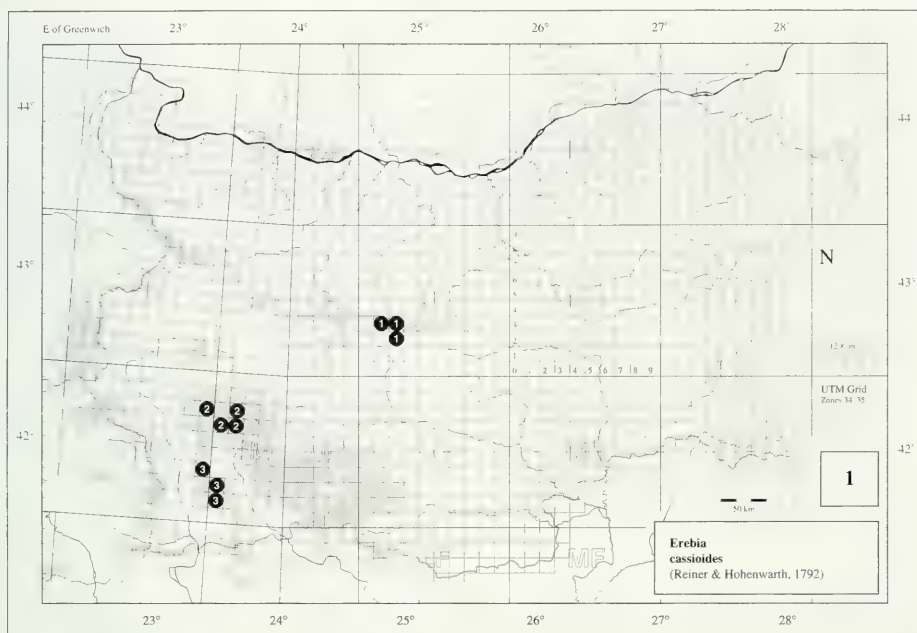


FIG. 1

Provisional distribution map of *Erebia cassioides* (Reiner & Hohenwarth, 1792) in Bulgaria.

(1) *E. cassioides kinoshitai* Beshkov, 1996 - LH13: Levski: 1780-2100 m (Beshkov, 1995: 202; Beshkov, 1996: 112, 116-119; Abadjiev, 1995: 136); LH22: Ravnets: 1900-1920 m (Beshkov, 1995: 202; Beshkov, 1996: 112-113, 116-117, 119-122; Coutsis *et al.*, 1997: 170-171); LH23: Botev: 2000 m (Buresch & Tuleschkow, 1929; 229; "*Erebia tyndarus balcanica* Rbl."; Lorkovic, 1957: 108, Taf. III; Beshkov, 1995: 202), Golyam Kupen: 1900 m (Beshkov, 1996: 119), Krastsite: 1820 m (Beshkov, 1996: 117, 119), Zhaltets: 2000 m (Beshkov, 1996: 113, 118-119, 122).

(2) *E. cassioides centrорilica* ssp. nov. - FM97: Tcherni Ridge: 2300-2400 m (Abadjiev, 1995: Pl. II, 113); GM06: Angelov Vrah: 2600 m (Beshkov, 1996: 112, 116, 118), Kanarata: 2500 m (Beshkov, 1996: 112, 116, 118); GM16: Dzhanka: 2400 m (Varga & Slivov, [1977]: 173; Beshkov & Nowacki, 1998: 46-47), Granchar Chalet: 2180-2700 m (Coutsis *et al.*, 1997: 170-171), Suha Vapa (Varga & Slivov, [1977]: 173; Abadjiev, 1993: 55); GM17: Ovcharets (Varga & Slivov, [1977]: 173; Abadjiev, 1993: 55).

(3) *E. cassioides macedonica* Buresch, 1918 - FM93: Kamenititsa Circus; GM01: Kamenitsa: 1800-2000 m (Lehmann, 1990: 125; Busse & Ockruck, 1991: 16); GM02: Banderitsa (Varga & Slivov, [1977]: 173), Bezbog: 2350-2450 m (Karisch & Eckert, 1989: 95; Abadjiev, 1997: 72), Popovo Ezero: 2300-2500 m (Buresch, 1918: 227; Buresch, 1921: 189, 191; Buresch & Iltschew, 1921: 63, 73; Buresch & Tuleschkow, 1929: 230; Warren, 1936: 294, Pl. 90; Abadjiev, 1993: 55; Abadjiev, 1995: Pl. XV; Beshkov, 1996: 112, 116, 118, 120; Abadjiev, 1997: 72), Vihren (Varga & Slivov, [1977]: 173).

DESCRIPTION

♂ (Figs 2-3): right forewing length - average 15.5 mm, 15.0 mm in the holotype; wing upperside dark brown with greenish reflection; forewing apex slightly rounded; subapical fulvous-red patch not extending to cell but usually extending to vein 3 and enclosing twin, white-pupilled ocelli; forewing underside brown to fulvous; submarginal line dark brown; postdiscal band dark brown, wide and well-defined in spaces 4-6; postdiscal fascia fulvous, encloses the ocelli; hindwing upperside with fulvous-red postdiscal marks enclosing usually 3 well developed ocelli; underside ground colour silvery-gray finely dotted with brown; submarginal fascia not well defined; postdiscal fascia with usually 2 small ocelli; discal band darker, brown-greyish.

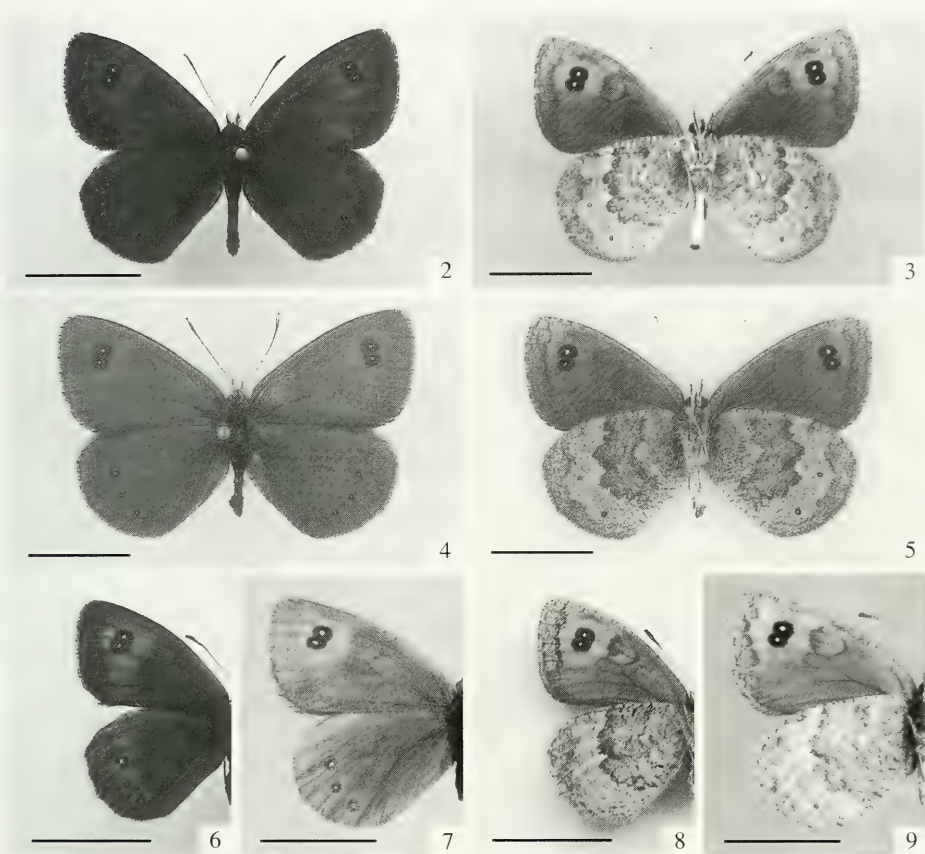
♀ (Figs 6, 8): right forewing length - average 15.5 mm; wing pattern as in male; upperside forewing subapical fulvous-red patch not extending to cell; submarginal line on the forewing underside dark brown and sharpened; postdiscal band clearly visible in spaces 1-3; hindwing underside ground colour lighter.

♂ *genitalia* (Fig. 10): uncus shorter than tegumen; gnathos slender, curved, shorter than uncus; saccus elongated, vinculum curved; aedoeagus short (but longer than valva), sclerotized in the middle; valvae on the costal part with a big proximal tooth; apically followed by another tooth (smaller than first one); apically valva rounded, usually with 2 small costal teeth; ♂ *genitalia* are illustrated also in Beshkov (1996: 118: Figs 32 [paratype 16] - 33 [paratype 15]) as "*Erebia cassioides macedonica* (Buresch, 1918) [sic]".

♀ *genitalia* (Fig. 13): sterigma with an Y-shaped clape of the lamella antevaginalis, the basis is twisted once ventrally and symmetrically laterally, the part before the furcation large, but equal in size before and after furcation, apex of the Y-shaped clape bifid, both parts of furcation long, forming an U-shaped structure; lamella antevaginalis with 2 lateral lobes, sclerotized, twisted near ostium bursae; ductus bursae short; ostium bursae sclerotized; corpus bursae with 2 longitudinal signa, each one composed by about 30 radial sclerotizations.

Variability: This subspecies is variable in forewing length (13.6-17.0 mm in ♂; 14.5-15.8 mm in ♀). Instead of the usual subapical fulvous-red patch extension to vein 3 in 1/3 of the males a small fulvous-red patch also present in space 2; in half of the females the subapical fulvous-red extends to vein 1. In 21% of the males ocelli number on the hindwing upperside is 4. The postdiscal fascia on the hindwing underside in 11% of the males is with 1 ocellus; in additional 4% with 3 ocelli.

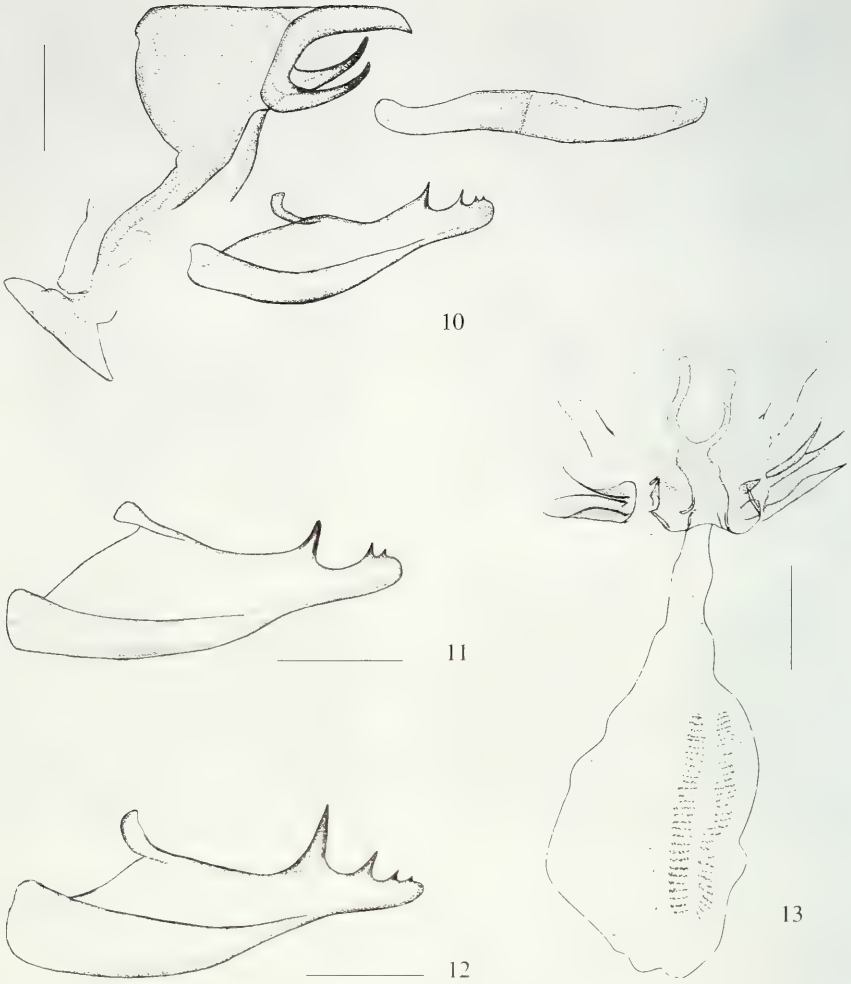
Differential diagnosis: *E. cassioides centroricola* ssp. nov. can be distinguished from its nearest relatives by the following differential features: forewing (especially in ♂) is not pointed as in *kinoshitai*; ocellation is not so strongly developed as in *illyrica* and *illyromacedonica*; dark brown postdiscal band on the underside of the forewing in ♂ wider and better-defined in spaces 4-6 than in *macedonica* (cf. Figs 3 and 5); submarginal line on the underside of the forewing in ♀ sharpened (Fig. 8), in *macedonica* usually blurred (Fig. 9); postdiscal band on the underside of the forewing in ♀ clearly visible in spaces 1-3, a feature usually absent in *macedonica*; "Uncus/



FIGS 2-9

(2) *E. cassioides centrorilica* ssp. n., holotype ♂, upperside, Bulgaria: Rila Mts: Suha Vapa: 2450 m: 13.VIII.1998: S. Abadjiev leg. (MHNG); (3) same, paratype ♂ [28], underside, Bulgaria: Rila Mts: Tcherni Ridge: 2400 m: 24.VII.2000: S. Aadjiev leg. (CIZS); (4) *E. cassioides macedonica* Buresch, 1918, syntype ♂, upperside, Bulgaria: Pirin Mts: Popovo Ezero: 2400 m: 16.VII.1915: I. Buresch leg. (NMNH); (5) same, underside; (6) *E. cassioides centrorilica* ssp. n., paratype ♀ [10], upperside, same data as in holotype (CSAS); (7) *E. cassioides macedonica* Buresch, 1918 ♀, upperside, Bulgaria: Pirin Mts: Kamenititsa Circus: 21.VII.1982: A. Slivov leg. (CIZS); (8) same as Fig. 6, underside; (9) same as Fig. 7, underside. Scale lines: 10 mm.

Subuncus-Längenindex" in *illyrica* and *illyromacedonica* is 75 (Lorkovic, 1957: 77), in *macedonica* - 75, in *kinoshitai* - 55, in *centrorilica* ssp. nov. - 65; "Höhenindex des dorsalen Valvenvorsprungs" in *illyrica* is 10, in *illyromacedonica* - 13 (Lorkovic, 1957: 76), in *macedonica* - 10, in *kinoshitai* 16, in *centrorilica* ssp. nov. - 17; the difference in size of the first 2 costal teeth is better-developed in *kinoshitai* and *macedonica* (Figs 11, 12); apically valva is more rounded than in *kinoshitai*; it bears 2 small apical teeth (Fig. 10), in *macedonica* - usually 1 (Fig. 11); Y-shaped clape of



FIGS 10-13

(10) Male genitalia of *Erebia cassioides centrorilica* ssp. n., paratype ♂ [16], Bulgaria: Rila Mts: Angelov Vrah: 2600 m: 31.VIII.1987: S. Beshkov leg., gen. slide 6./06.III.1995, Beshkov (CSBS); (11) Valva of *E. cassioides macedonica* Buresch, 1918, syntype ♂, Bulgaria: Pirin Mts: Popovo Ezero: 2400 m: 16.VII.1915: I. Buresch leg., gen. slide 3./29.II.1996, Beshkov (NMNH); (12) Valva of *E. cassioides kinoshitai* Beshkov, 1996, paratype ♂, Bulgaria: Central Stara Planina: Levski Top: 1780 m: 7.VIII.1995: S. Beshkov leg., gen. slide 1./29.II.1996, Beshkov (CSBS); (13) Female genitalia of *E. cassioides centrorilica* ssp. n., paratype ♀ [17], Bulgaria: Rila Mts: Angelov Vrah: 2600 m: 31.VIII.1987: S. Beshkov leg., gen. slide 8./06.III.1995, Beshkov (CSBS). Scale lines: 0.5 mm.

lamella antevaginalis is with long part before the furcation in *kinoshitai*; the 2 parts are equal in size in *centrorilica* ssp. nov; the part after furcation forms a V-shaped structure in *macedonica*, rather than the U-shaped in *centrorilica* ssp. n. and *kinoshitai*.

DISTRIBUTION

The new subspecies is an endemic of Rila Mountains, Bulgaria. The colonies known are located at an altitude of 2180-2700 m. For exact localities see text explanation of Fig. 1.

BIONOMICS

Flight-period: Univoltine; flies from the end of July (24.VII, Tcherni Ridge: 2300-2400 m) till the second decade of September (18.IX, Tcherni Ridge: 2350 m) (Abadjiev *et al.*, 1999: 275: “*Erebia cassioides macedonica* Buresch, 1918”).

Habitat: Reported as “... observed flying in screes formations often along the alpine lakes” (Abadjiev, 1993: 55: “*Erebia cassioides macedonica* Buresch, 1918”). The biotope on the slope of Tcherni Ridge is illustrated in Abdjiev (1995: Pl. II: Fig. 2: “*Erebia cassioides macedonica*”); represents a scree with SW exposition. Similar is the habitat at the type locality Suha Vapa, where *centrorilica* ssp. n. flies on the SW rocky slope of the peak (which exactly forms a NE side of the circus of Yakoruda Lakes).

Larval hostplant and immature stages: Unknown.

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